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MEMORANDUM TO HOLDERS

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INTELLIGENCE
ESTIMATE

Warsaw Pact Forces For Operations in Eurasia

CIA HISTORICAL REVIEW PROGRAM
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NIE 11-14-71

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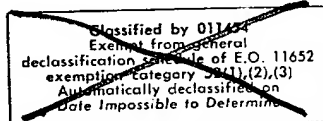
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NIE 11-14-71

WARSAW PACT FORCES FOR
OPERATIONS IN EURASIA

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ANNEX: TACTICAL ANTISUBMARINE WARFARE

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WARSAW PACT FORCES FOR OPERATIONS IN EURASIA

I. NATURE OF CHANGES

1. In the short time which has elapsed since NIE 11-14-71 was issued, there have been several developments which should be brought to the attention of those holding that Estimate. These developments include new or additional information on troop deployment, weapon systems, or force capabilities. In addition, CIA and DIA have been carrying out joint research on Warsaw Pact logistic support, and their study to date provides more reliable data than were available at the time that NIE 11-14-71 was published. Also, new analysis is available on the USSR's capabilities for antisubmarine warfare (ASW) operations in defense of its own naval forces and merchant shipping. The result of this latter analysis is presented at Annex and summarized in the text of this memorandum. The new information and reanalysis has not altered our basic judgments in NIE 11-14-71. We find those judgments to be still valid.

II. THE STATUS OF SOVIET FORCES ALONG THE SINO-SOVIET BORDER

2. *Divisions.* The size and disposition of Soviet forces along the border with China have remained generally unchanged since publication of NIE 11-14-71. Re-evaluation of the Pacific Fleet area has indicated that the naval infantry forces there are being organized into a division-like structure. No new divisions have been added in the immediate border area in the last year and a half, and the Soviets may now concentrate on filling out units already deployed there. They have, however, recently deployed major elements of a motorized rifle division in the Siberian Military District (MD). The initial elements of the division arrived this spring and join 4 other divisions in the MD.

3. In the Central Asian MD, four garrison areas that had been thought to house two understrength and incomplete divisions were found to house a single and nearly full strength motorized rifle division. Conse-

quently, the estimated number of divisions in that MD has been reduced from the seven cited in NIE 11-14-71 to six.

4. *Fortified Areas.* The Soviets have evidently resurrected a defensive concept first used in the Soviet Far East in the late 1930s to defend against Japanese incursions. As many as 10 Soviet combat units of a new type are deployed in the Far East MD along major avenues of approach from China. These units are not identical in structure. They are about half the size of a motorized rifle regiment and lack the infantry maneuver elements but have more fire support. These new units probably are part of a defensive formation known as a "fortified area" (*ukrepyennyy rayon*) which the Soviets define as an area with prepared field fortifications and a permanent garrison to man them.

5. Each fortified area typically has prepared defensive positions, including artillery and anti-aircraft gun emplacements, tank revetments, trenches, and bunkers. Nearby, in garrison areas, are the new type units which would probably occupy the field fortifications in time of crisis. One other fortified area may be located in the Transbaykal MD. Additional fortified areas may exist elsewhere in the border area.

6. We believe that these fortified area units provide (a) increased border security (supplementing the KGB Border Guard units deployed along the border); (b) a freedom to commit ground divisions to other actions; and (c) a time delay factor to permit mobilization and reinforcement of existing general purpose forces along the border.

7. *Logistic Support.* Emphasis continues to be placed on developing better logistic support, particularly at higher ground force echelons, for the combat forces already deployed along the border. Since publication of NIE 11-14-71, new army and front-level support

units have been identified and others have received additional equipment. This process is continuing. By now, most divisions have their essential combat and combat support units. Heretofore, the bulk of the border units lacked cargo trucks and logistic support personnel. Now, however, they are receiving these trucks and personnel, thereby reducing the shortages which in the past have limited their ability to carry out operations. Present indications are that the Soviets do not intend to bring all their divisions in the border area to full combat strength but instead contemplate a force which would be maintained at reduced strength and would require the mobilization of reservists and vehicles—principally cargo trucks—from the civilian sector prior to operations. Nevertheless, because of their remoteness from major urban sources of manpower and equipment, the divisions along the Sino-Soviet border probably will be manned and equipped at higher levels than units in the western USSR.

8. *Frontal Aviation.* Since NIE 11-14-71, new aircraft have been added to Frontal Aviation units on the border, and there has been a slight increase in numbers of aircraft—from some 1,000 to about 1,100. There has been a substantial increase in numbers of helicopters—from 300 to 440.

III. RECENT DEVELOPMENTS IN EQUIPMENT AND ORGANIZATION

Ground Forces

9. *Nuclear Warhead Storage in Eastern Europe.* In NIE 11-14-71 we noted that nuclear weapon storage facilities existed in Eastern Europe. These were at five Soviet-controlled airfields in East Germany, Hungary, and Poland. There were also seven other European storage sites, whose subordination was not known, but whose function might be the storage of nuclear warheads for tactical surface-to-surface missiles and rockets. Subsequent to

the approval of NIE 11-14-71, there have been no significant changes at these sites. Five more sites—apparently intended to hold tactical nuclear warheads—have been identified. Evidence indicates that these sites are operational, and they appear to be occupied by the Soviets.

10. Of the 12 storage sites apparently supporting tactical missile units, two are in East Germany, three in Poland, three in Czechoslovakia, one in Hungary, and three in Bulgaria. Most of them are set off by themselves but are within 25 miles of tactical missile units or support facilities, either Soviet or East European. All the sites were constructed between 1966 and 1968.

11. The locations and size of the sites suggest that each is designed to support one Scud missile brigade and the three to five FROG (free-rocket-over-the-ground) battalions normally found in an army area. If this pattern is repeated throughout Eastern Europe, an additional eight to nine sites may be found there. The five storage sites associated with Soviet airfields in Eastern Europe may also be intended to hold warheads for tactical missiles. The 17 identified sites could contain 500 to 1,000 nuclear weapons, depending on storage arrangements.

12. We believe the Soviets are now storing nuclear weapons at nuclear storage sites in Eastern Europe. Soviet concepts of how nuclear war in Europe is likely to evolve emphasize the importance of launching a massive coordinated nuclear strike once it was concluded that NATO would introduce nuclear weapons. This concept would require a warhead supply system structured to deliver warheads to the missile units swiftly and with a minimum chance of disruption.

13. *Low-Yield Tactical Nuclear Weapons.* In NIE 11-14-71, we noted that Warsaw Pact

forces had some capability to exercise nuclear options short of a strategic nuclear strike and that their targeting doctrine called for use of nuclear weapons against maneuver and support elements. We also noted that the Soviets had the technical capability to develop nuclear artillery rounds, but that there was no evidence that they had done so. We continue to receive unconfirmed reports that the Soviets have developed a nuclear artillery round, but we still have no persuasive evidence that they have done so.

14. SA-4. The mobile SA-4 system, designed to provide medium- to high-altitude defense for ground forces, is now extensively deployed in the USSR and with the GSFG. It has now also appeared in limited numbers with the Soviet forces in Czechoslovakia and Hungary. There is no firm evidence of deployment with Soviet forces in Poland.

15. SA-6. Deployment of the SA-6 mobile low-altitude air defense missile system has now been identified with Soviet ground force units in East Germany. Several SA-6 units have been active in a Soviet training area in East Germany, but their subordination cannot be determined. SA-6 units also are deployed in five ground force division areas in the USSR. The SA-6 unit appears to be replacing the divisional anti-aircraft artillery regiment. It is not known whether this is also the case with the SA-6 units in East Germany.

16. The SA-6 unit in Soviet ground force division areas in the USSR apparently consists of 2 launch battalions, each with 8 triple launchers, 1 acquisition radar, and 2 tracking and guidance radars. Each battalion probably has 2 firing units, each with 4 triple launchers and 1 tracking and guidance radar.

17. *Man-Portable SAM.* Since publication of NIE 11-14-71, we have acquired no new information regarding the deployment with Soviet forces of the man-portable, shoulder-

fired SA-7 Grail. We have, however, obtained considerable information on its technical characteristics. During the North Vietnamese offensive in the spring of 1972, the SA-7 was introduced into South Vietnam. SA-7 missiles and launchers were captured by South Vietnamese forces, and preliminary examination of the captured equipment (manufactured in 1968) confirms that our earlier assessment of the SA-7 was generally sound. The SA-7 is believed to be effective at a maximum range of 2 nautical miles (nm) and up to a maximum altitude of about 9,000 feet. The missile speed is unknown at this time, but is likely to be supersonic.

18. The system intercept capability in any particular engagement is heavily dependent on the target speed, altitude, maneuvers, and infrared signature. In most cases the target would be engaged in a tail-on aspect. The missile employs a small warhead (weighing 2.6 pounds and containing about 1 pound of high explosive) and requires a direct hit to be effective.

19. *New Soviet Tanks.* There is evidence that a new type medium tank is now at least in limited series production. The plant which produces these tanks is not known.

20. The new tank is conventional in design and does not appear to be a significant technological improvement over the T-62. It appears to be armed with a gun similar to the 115 mm smoothbore armament of the T-62. According to one source, it is lower, faster, and quieter than present Soviet tanks and is equipped with a multilayered composite armor to reduce spalling and provide better protection against nuclear radiation.

21. The new tank will presumably be issued initially to Soviet units to replace the older tanks in the inventory. If the new tank is produced at the same rate as the T-62—about

1,500 per year—the T-55s and T-62s will continue to comprise the bulk of the Soviet force through the 1970s.

22. A new light amphibious tank was seen in 1971, but the state or extent of its production cannot be determined. This tank is smaller than the PT-76 and is armed with a 76 mm smoothbore gun and an antitank guided missile. It is air droppable.

Naval Forces

23. *Air-Associated Combatant.* The Soviets are in the process of constructing a large ship at Nikolayev. It is reportedly about twice the displacement of the Moskva-class helicopter ship. We believe that the new large ship is designed to carry helicopters and V/STOL aircraft. It could be operational by about 1975. Such a ship could be capable of a number of roles—including ASW, reconnaissance, air defense, and possibly limited tactical strikes—depending on the aircraft carried (including helicopters) and the operational situation. It probably will not be an attack aircraft carrier in the Western sense.

24. *Possible Naval Missile:* [] Since December 1969 the Soviets have been testing at short ranges a ballistic missile capable of maneuvering in flight to change the impact point of the re-entry vehicle (RV). []

25. []

Frontal Aviation and Air Defense

29. During the past year there have been increasing indications that the Soviets are giving greater attention to the ground attack role in Frontal Aviation. New aircraft such as Flogger and Fishbed J/K provide more flexibility for use of air defense aircraft in the ground attack role. Fishbed units have also increased their ground attack training. The new RAM-F will provide improved conventional weapons delivery capability. Increased emphasis on aerial reconnaissance adds better target acquisition capability. Electronic countermeasure support to Frontal Aviation is also being improved to provide active and passive countermeasures for an attacking force. These changes will provide Soviet commanders a greater flexibility in the use of Frontal Aviation to support ground forces in conventional or nuclear operations.

30. *Deployment.* The variable-geometry-wing fighters, Flogger and Fitter B are continuing to be deployed with operational units, but at a slow pace. Since NIE 11-14-71, Fitter B has been delivered to two regiments and there are now about 70 in service.

31. Flogger deliveries resumed in May of this year after a hiatus of some 20 months. (The Soviets had delivered about 40 in 1970.) Evidence suggests that at least one and possibly two squadrons have been deployed with one regiment in the western USSR. This could bring total Flogger in service to some 50 to 60 aircraft. During the gap in deliveries, production continued at the two airframe plants involved, and the delay in deliveries may have been due to technical difficulties which have now been eliminated.

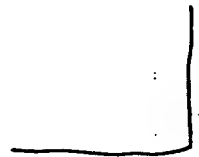
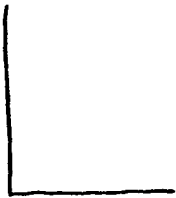
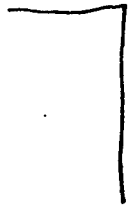
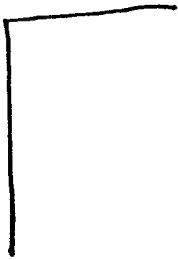
32. Deployment of the reconnaissance version of the Mach 3 Foxbat to Frontal Aviation is still limited to one training unit, although the number increased from about 6 to 12 aircraft. The Soviets are continuing to deploy

26. [

27. [

28. There still are many uncertainties, about the ultimate objectives [] If [] complete weapon system, it will probably turn out to be a short-range (100 to 300 nm) naval ballistic missile. It appears suited to attacking moving targets—aircraft carriers and other major surface ships, for example. But it is also possible that it is not a weapon system in itself, but merely a test bed []

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interceptor variants of the Foxbat with the air defense force, however, and the priority given to satisfying the initial needs of this force may account for the slow deliveries to Frontal Aviation.

33. [] The Soviets are continuing to test a large variable-geometry-wing fighter [] This aircraft has a range and payload capability—particularly for conventional bombs—which is considerably greater than any of the aircraft now in Frontal Aviation. [] will probably be employed in Frontal Aviation as a fighter-bomber aircraft. []

[] It will likely be produced at the Novosibirsk aircraft plant, the current production site for the Flagon interceptor. It will probably enter production there when Flagon production draws to a close—probably by the end of this year. If so, it will probably enter service with Frontal Aviation by 1974.

34. *Tactical Air-to-Surface Missiles (ASMs).*

[] has a maximum range of about 20 nm and a speed of about Mach 1. []

[] it may be an antiradiation weapon like the US Shrike, but other possible guidance such as television or inertial command cannot be ruled out. The missile could enter service about 1975.

35. In addition, the Soviets may now be equipping some of their Frontal Aviation forces in East Germany with another tactical ASM. Last September, a missile that resembles the US Bullpup was photographed on a Soviet Mig-21 fighter in East Germany. It has been

designated the AS-7 Kerry. The missile was fired at a ground target about 3.5 nm from the aircraft. No testing of this missile has been detected in the USSR, however, and it has not been seen again in East Germany since September. It is not known, therefore, how widely the missile is deployed or how its guidance system functions.

36. *MI-24 Hind Helicopter.* The Soviets have developed and are producing a new assault helicopter, the MI-24 Hind. It is probably destined for service with Frontal Aviation. Production at Arsenyev in the Far East MD had reached an estimated 30 as of the end of mid-1972. Initial deployment is expected this year, probably to existing helicopter units in the Far East and Transbaykal MDs.

37. The Hind is not a gunship, in the sense that the US Huey Cobra and Cheyenne helicopters are gunships, but is basically an armed transport, like other Soviet helicopters. It can carry 15 persons in addition to the crew. There are, however, some important features which improve its capability for armed missions:

—It is more maneuverable, with its estimated maximum speed of 185 knots, some 60 knots faster than the MI-8 Hip.

—It has stub wings which carry armament and add lift and stability in cruising flight.

—It has a low silhouette and narrow profile.

These features, together with its speed, will make it a more difficult target for ground fire.

38. Hind's primary mission probably will be to provide armed support and transport for airmobile or heliborne operations; it probably will also be used for other combat support. The Soviets have used helicopters in an anti-tank role during exercises, but few details are available. There is no indication that the Soviets intend to employ large numbers of helicopters as a primary antitank weapon.

39. There is no evidence that Hind machine guns, cannons, or other weapons will be contained in an armament turret faired into the fuselage as on US gunships. Some Hind have two ordnance pylons under each stub wing while one has been seen with what appears to be a rocket under the wing. Hind's armament options probably are similar to those of older Soviet medium helicopters—MI-4 Hound and MI-8 Hip—which can carry machine guns, cannons, unguided rockets, anti-tank guided missiles, and bombs.

40. *Passive Defense Measures.* The Soviet Union, and to a lesser extent her Warsaw Pact Allies, continue to implement their ongoing program to increase the survivability of essential military systems by hardening against nuclear and/or conventional weapons. General Staff and GSFG command, control, and communications facilities have been provided bunkers and hardened antennas. Construction of hangarages has continued to the point that most Frontal Aviation airfields in Eastern Europe and the USSR possess such protection. Most of the SAM-associated electronic vans of the air defenses of the *front* have also been protected by revetments.

IV. TACTICAL ANTISUBMARINE WARFARE¹

41. Over the last dozen years the Soviet Navy has made a substantial effort to build up its capabilities for ASW. Soviet interest in the subject appears to have been greatly stimulated by the advent of the nuclear-powered ballistic missile submarine and the new strategic dimensions it provided. In practice, however, an overwhelming proportion of

¹ This section summarizes an evaluation of Soviet tactical ASW equipment operations, and capabilities contained in an Annex to this Memorandum to Holders of NIE 11-14-71.

the Soviet ASW effort to date has been devoted to the tactical aspect of the problem—i.e., the defense of Soviet naval forces and shipping against hostile submarines. This section is primarily concerned with the Soviet tactical ASW effort, though it necessarily considers equipment which can be used for strategic ASW operations, i.e., against Polaris.

42. Since 1960, ASW detection gear and weapons have been provided for all surface combatants, though they all have substantial armaments for other purposes. Much of the coastal defense force, the largest in the world, is designed for ASW operation. All Soviet general purpose submarines have some potential for ASW operations,² although more than half the nuclear-propelled units are equipped with cruise missiles and are intended primarily for use against surface ships, and the remainder, based on their operations, are multipurpose attack submarines. Since the mid-1960s, the Soviets have introduced long- and medium-range ASW aircraft as well as improved coastal types. The Soviet Navy also has both land-based and shipborne ASW helicopters.

43. Each of the four fleet commanders has a variety of ASW-capable surface, air, and submarine units under his command, and ASW exercises have been a regular feature of fleet level training. Most of these involve short-range operations. Recently, however, the Soviets have shown increasing concern over providing ASW protection in their sea approaches, suggesting that they intend to extend their ASW defenses further to sea. In the major annual exercises conducted by the Northern and Pacific Fleets, ASW activity has grown to include what are probably combined ASW

² Soviet nuclear-powered ballistic missile submarines also carry torpedoes, but their ASW capabilities are not considered here.

barrier and search operations off north Norway. ASW operations were carried out during the major 1970 exercise "Okean", although over three-quarters of the defending forces were principally engaged in anticarrier and antishipping operations. The Soviet Mediterranean Squadron has also practiced the formation of combined ship and submarine barriers across the Sicilian Straits and south of Crete. ASW has received less attention in other out-of-area operations although some practice in escorting convoys has taken place.

44. Despite the sizeable effort the Soviets have made with the tactical aspects of ASW, the results to date have not been impressive. Many Soviet ASW operations and exercises have failed to demonstrate the tactical sophistication and proficiency needed to cope with a modern nuclear submarine. Most important of all, almost all Soviet sensor systems are currently inadequate to the task of detecting and localizing enemy submarines before they are close enough to attack.

45. The older major Soviet surface ships have first or second generation sonars with effective ranges of no more than 4,000 or 5,000 yards even under the most favorable conditions. The Moskva ASW helicopter carrier and possibly the Krivak destroyer are equipped with the latest model sonars, which have direct path ranges of some 13,000-15,000 yards.³ First convergence zone ranges (20-30 nm) are possible with these sonars.⁴ In all, however, fewer than 15 major Soviet ships have ranges approaching even 10,000 yards. Most Soviet sonar performance appears to be further limited by deficiencies in signal processing and signal structure which prevent full exploitation of the sonar's range potential.

³ Direct path—the acoustic signal goes directly to the target and bounces back to the source.

⁴ Convergence zone—ring-like zones of sound focusing more than 20 miles from a sonar, occurring in many deepwater ocean areas.

46. Although there has been steady improvement, Soviet capabilities in submarine sonars also remain inferior to those of the US. Many sonars are of older and less efficient types. Even the more modern ones have effective passive ranges only about half those of modern US submarine sonars, in part because of design limitations and because of the high level of noise generated by Soviet submarines.

47. Improvements in Soviet ASW equipment and training are expected. The Soviets are probably continuing to experiment with low-frequency sonars to extend the detection range and improve the accuracy of their systems. R&D on ASW is also going on in other areas. They will probably also take some steps to reduce the high noise levels of their submarines. Improvements can also be expected in other areas of ASW technology, including weapon design.

48. Over the next few years, however, the Soviet Navy will not have any significant capability for defending its seaborne forces from attack by Western submarines, particularly nuclear. Even if new sonars and other modern detection gear are introduced, their introduction in the bulk of the surface fleet units would require a number of years. Moreover, the ASW task will be complicated by US development and replacement programs.

V. WARSAW PACT LOGISTIC SUPPORT

49. The assessment of Warsaw Pact logistic support contained in Annex F of NIE 11-14-71 reported some significant analytical problems. These are still under study. Significant progress has been made in the areas which are discussed below.

50. *Planning Factors.* We now have good evidence on the planning factors used to calculate Warsaw Pact ammunition requirements,

although we must still make some assumptions in applying them. To determine the potential requirements, Warsaw Pact planners use estimated expenditure rates calculated in accordance with the type of combat expected. Consumption is expected to be more rapid in the attack phase than in the exploitation phase of a campaign or in a period of passive defense. These estimated expenditure rates are calculated for each weapon and unit and are expressed in terms of so many units (or partial units) of fire, each unit of fire representing a fixed number of rounds per weapon.

51. Use of such factors permits a far more precise and meaningful calculation and measurement of Warsaw Pact logistic requirements and capabilities than our previous use of such a measure as "days of supply". The "day of supply" standard made no allowance for the fact that daily expenditures vary greatly depending on the specific daily combat situations encountered during the course of a campaign. Although the term "days of supply" has been used in Soviet logistic writings, it has appeared in general contexts without any indication of what specific expenditures it might represent.

52. *Scenarios.* To determine the effect of different combat situations on the logistic requirements of the three Warsaw Pact fronts which would engage NATO forces in the Central Region, two conventional war scenarios were developed. Both assume a 21-day period of mobilization. Scenario A involves a 10-day advance to the Rhine under conditions requiring relatively low ammunition expenditures after the initial days of attack. Scenario B involves much heavier fighting and ammunition expenditure, with the Pact forces forced to halt short of the Rhine after 10 days of much slower advances.

53. The scenarios do not encompass the entire range of ways in which a Warsaw Pact-

NATO battle might develop, but they are faithful to Pact plans as we understand them]

They necessarily lack elements of realism, as they exclude important but unquantifiable factors. Some factors, such as interdiction, attrition, and bad weather would reduce the capabilities of the logistics systems. Other factors, such as the quality of command judgment—specifically, an ability to alter plans and practices to meet unforeseen situations—could either enhance or reduce the capabilities of the system.

54. *Size of Ammunition Stocks.* The study has resulted in estimates of ammunition stocks in the GSFG as follows:

a. *Mobile divisional stocks.* Each division is estimated to be able to carry at least 1,600 metric tons and possibly as much as 2,100 metric tons of ammunition loaded on organic vehicles, in the hands of troops, or carried with crew-served weapons. The higher number reflects the tentative finding, based on a restudy of the motor transport battalions of four GSFG divisions, that the number of vehicles in ammunition transport companies might be higher than previously estimated.

b. *Ammunition depots.* Divisional ammunition depots in the GSFG have the capacity to store at least 29,000 metric tons and possibly as much as 34,000 metric tons. Soviet army and front-level ammunition storage facilities in East Germany could store an estimated 218,000 to 264,000 metric tons. The high side of the range represents the effect of adding suspected storage facilities to those confirmed as being for that purpose.

55. *POL Stocks.* POL (petrol, oil, lubricants) stores of the GSFG ground forces are estimated at some 365,000 metric tons. East Ger-

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man army ground forces POL is estimated at some 50,000 metric tons. Ground force POL stores could be supplemented by drawing from the civilian stocks of POL available in East Germany.

56. *Numbers of Logistic Vehicles.* There are some 7,300 general purpose cargo vehicles and some 1,000 POL vehicles in army and front-level motor transport units in the GSFG to support logistic transport requirements.

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ANNEX

TACTICAL ANTISUBMARINE WARFARE

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TACTICAL ANTISUBMARINE WARFARE

Note: This Annex evaluates the Soviet Navy's equipment, operations, and capabilities for tactical antisubmarine warfare (ASW)—i.e., the defense of Soviet naval surface forces and shipping against hostile submarines.

I. SOVIET TACTICAL ANTISUBMARINE WARFARE FORCES

1. The Soviet Navy has traditionally been most concerned with preventing hostile naval forces, whether surface ships or submarines, from operating in its home waters and their approaches. To this end it has long maintained the largest coastal defense force in the world, much of it designed for antisubmarine operations. With the expanding scope of Soviet naval high sea operations, however, defense of deployed forces has become more of a factor.

2. Most of the principal components of the Soviet Navy now have some capability for anti-submarine warfare (ASW). The offshore defense forces are charged with coastal ASW and protection of intracoastal shipping. Aerial ASW support is provided by naval aviation units to each fleet in coastal areas, in the open ocean, and in the Mediterranean. The larger Soviet multipurpose surface ships from escort size on up, while performing their primary missions, are responsible for their own defense against submarines and are responsible for escorting some convoy groups and occasionally assisting in coastal defense. The submarine forces—whose role in ASW is small but increasing—have been observed, albeit infrequently, conducting submarine versus submarine exercises in barriers.

3. The ASW-capable forces are distributed by fleets approximately as shown in the Table. The basic characteristics of these forces are outlined below.

4. *Major Surface Forces.* The major surface forces are intended primarily for general purpose operations. The current force of 209 ships (excluding those deployed in the Caspian Sea) includes 2 ASW helicopter carriers, 27 cruisers, 74 destroyers,⁵ and 106 destroyer escorts (or ocean escorts). The Soviets designate some of their newer cruisers and destroyers as "large ASW ships", but all of these ships have multipurpose capabilities. While these ships carry improved ASW systems, they also have strengthened air defense armaments; most of the newer units carry cruise missiles for anti-ship missions. The bulk of the ASW-equipped ships are of the destroyer escort type and are used by the Soviets for operations conducted within about 500 nautical miles (nm) of the USSR or in the Mediterranean Sea.

5. The newest of the major combatants is the Kara-class missile cruiser now entering service. The appearance of this 9,000 ton vessel may be accompanied by an end to the Kresta II program after the seventh unit is completed. Construction of the new Krivak-

⁵This number excludes 3 Krupnyy and 3 Kildin now being converted to new classes.

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TABLE
SOVIET FORCES CAPABLE OF ANTISUBMARINE WARFARE
1 JULY 1972

	NORTHERN FLEET	BALTIC FLEET	BLACK SEA FLEET	PACIFIC FLEET	TOTAL
Major Surface Forces (Cruisers, Destroyer Escorts)					
First Line* (8 kHz Frequency or Lower Sonar)	7	2	4	0	13
Second Line* (High Frequency Sonar)	40	46	59	51	196
Coastal Defense Forces Patrol Craft, Escorts (Grisha, Poti, Stenka, Other)	21	85	59	47	212
Fleet Air Forces					
Long- and Medium-Range (May and Bear)	35	0	0	20	55
Coastal (Mail)	20	10	25	25	80
Helicopters (Hormone and Hound)	60	30	90	65	245
General Purpose Submarine Forces					
Current Generation (V, C, A, and P)	21	0	0	0	21
Early Generation					
Nuclear (E-I, E-II, and N)	23	0	0	24	47
Diesel (F, R, and J)	54	4	3	21	82

*First line major surface forces, in ASW terms as defined here, include those ships equipped with 8 kHz or lower sonars. These include the Moskva, Kresta II, Krivak, Kara and Kanin classes. Ships with higher frequency sonars are included as second line. Ships deployed in the Caspian Sea are excluded.

class missile destroyer continues, and is expected to reach a rate of three or four units per year. Construction of the older Kashin-class appears to have ended with the launching of the twentieth unit.

6. Modification activity also plays an important role in the continued upgrading of the major surface forces. Krupnyy-class cruise missile destroyers are being converted to the surface-to-air missile-armed Kanin-class. A similar program will probably be undertaken for the Kildin-class destroyers.

7. *Coastal Defense Forces.* Smaller escorts and patrol craft provide surface ship ASW capabilities in coastal areas. In contrast to the

major surface forces, many of these units are equipped mainly for ASW tasks, although they also perform general patrol duties.

8. The most important new minor combatant of ASW interest is the Grisha-class. This unit is considerably larger than earlier patrol craft, and falls in a category somewhere between the ocean escorts and coastal patrol craft. Construction is estimated at five to six units per year.

9. *Fleet Air Forces.* Most of the ASW aircraft currently deployed are suitable only for operations in coastal areas. In the past few years, however, the Soviets have deployed about 45 medium-range (May) and about 10

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long-range (Bear F) ASW aircraft. In addition, each of the two helicopter carriers can support up to 20 ASW helicopters, and a few other major surface combatants can carry one or two helicopters.

10. The Il-38 May aircraft entered service in 1968 and continues in production at a rate of about one aircraft per month. In late 1969 or 1970 the Soviets also began making an ASW version of the Tu-95 Bear heavy bomber, the Bear F. Production of the Bear F may be continuing at a low rate, although there is no evidence to confirm any increase in the force since early 1972. The Soviets are continuing low-rate production of the Ka-25 Hornet helicopter and Be-12 Mail amphibian ASW aircraft.

11. *Submarine Forces.* All Soviet general purpose submarines have some potential for ASW operations.^a Of the 68 nuclear-powered submarines in service, however, 40 are armed with cruise missiles and have a primary anti-ship mission. The remainder, termed multi-purpose by the Soviets, exercise in antishipping and ASW roles. All Soviet submarines continue to be handicapped by their noisiness in comparison to US units, but the late model nuclear submarines have a speed advantage.

12. The nuclear-powered V-class attack submarine—the world's fastest operational submarine—continues in production at a rate of two units per year. The nuclear-powered C-class cruise-missile submarine also is being built at a rate of two per year. The Soviets have also built single units of two other new nuclear-powered submarines, the A- and P-classes, but it is not known whether series pro-

^a In addition there are 35 nuclear-powered ballistic missile submarines (SSBNs) which have some ASW potential although they are unlikely to be found performing in other than their strategic attack role.

duction is intended. The P-class is a cruise missile type, and is believed to have new missiles. The mission of the A-class is unknown—it could be a one-of-a-kind research vehicle or the prototype of a new ASW submarine class.

II. ANTISUBMARINE WARFARE WEAPONS

13. ASW weapons in use in the Soviet Navy consist of acoustic homing torpedoes, standard depth charges, small, rocket-propelled charges (the multibarrel unit) fired in salvos from surface ships, and a new rocket-propelled depth charge (probably with a nuclear warhead) on the Moskva-class. Although these weapons apparently work in simple exercises, their capabilities against evasive Western tactics and countermeasures are not known. In addition to these ASW weapons, the Soviets also have mines which are believed to have ASW application, including aluminium and rising mines which apparently were designed to combat Western nuclear submarines.

III. THE SENSOR PROBLEM

14. Environmental conditions limit the performance of sensors in locating a submarine and pose one of the greatest obstacles to the development of an effective ASW capability. To be effective, the sonar, the most widely used sensor, must discriminate the noise of the target submarine (or the returning echo) from its own internal noise, the platform's noise, and the ambient noise of the sea. In the active mode a sonar's capabilities are degraded by sound energy reflecting from the ocean surface and from the bottom, by sound energy being scattered within the ocean, and by sound energy absorption in the ocean.

15. The adverse effects of some natural phenomena can be reduced by using sonar

which operates at lower frequencies (usually below 5 kHz). A lower-frequency signal results in less absorption of sound in the ocean than higher-frequency signals. A large acoustic array is required, however, to obtain directional accuracy and high-power levels at lower frequencies.

16. *Long-Range Sensors.* There is no evidence that the Soviets have produced acoustic or non-acoustic detection devices useful for long-range (over 100 nm) detection of submerged submarines. The Soviets have not attempted a large-scale acoustic undersea surveillance system such as the US SOSUS system; the Soviet fixed acoustic detection devices are passive systems with a range of about 10 nm against quiet nuclear submarines and up to 50 nm against a snorkeling diesel submarine.

17. *Surface Ship Sonars.* The present inadequacies of the Soviets' ASW sensors—especially sonars—is a major factor limiting their ASW capabilities. About 40 percent of the Soviets' major ASW surface ships have old model sonars (24 to 30 kHz) which provide a detection range⁷ of only about 4,000 yards, even under the most favorable conditions. Another 50 percent of the ships are equipped with sonars of the 15 to 23 kHz range with a detection range of about 5,000 yards. These sonars are not of low enough frequency and high enough power to provide long-range detection capability.

18. Fewer than 15 major Soviet ships are equipped with the latest sonars (3 to 8 kHz) with range potentials similar to those of currently operational Western sonars. The 8 kHz hull-mounted sonar is installed on the Kanin and Kresta II destroyers and probably on the Krivak. The 8 kHz variable depth sonar (VDS) is installed on some Petya escort ships, the Moskva helicopter carrier, and the Krivak

⁷ Ranges given here are for initial detection (rather than redetection or tracking) under good conditions.

destroyer. The VDS enables the Soviets to fill gaps in sonar coverage resulting from layers of varying water temperatures. Initial detection range under good conditions would be about 4,500 to 7,500 yards. Other new sonars employing frequencies in the 3.0 to 4.5 kHz range and with sufficient power to achieve substantial improvements in detection ranges are installed on the Moskva helicopter carrier and possibly the Krivak destroyer. Direct path ranges of some 13,000 to 15,000 yards and first convergence zone ranges (20 to 30 nm) are possible with these sonars.

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20. *Submarine Sonars.* Despite steady improvement, Soviet capabilities with submarine sonars remain inferior to those of the US. About 45 percent of the Soviet general purpose submarine force (the W-, Z-, and Q-classes) are equipped with old model sonars which are relatively ineffective as their power levels are low and they use high frequencies (24 to 30 kHz). Another 45 percent of the general purpose submarine force (the E-, N-, F-, R-, and J-classes) are outfitted with second-generation sonars which feature improved active and passive operation, lower frequencies (15 kHz), and greater power. These second-generation sonars are estimated to achieve passive detection ranges less than one-half those of modern US submarines.

21. Soviet submarines which have become operational since 1966—about 10 percent of the attack and cruise-missile submarine forces

(the C-, V-, P-, B-, and A-classes)—are believed equipped with active sonars of the third generation featuring a 3 kHz frequency. This frequency provides potentially long detection ranges. Soviet passive ranges are now estimated to be one-half those of modern US nuclear submarines. Some of this difference in capability probably results from the high level of noise generated by Soviet submarines and possibly from poor signal processing.

22. *Dipping Sonars.* A dipping sonar, carried by the KA-25 Hormone helicopter, operates in active or passive modes. In the active mode the dipping sonar can probably obtain detections at ranges of about 6,000 yards. In the passive mode it probably obtains detection up to 2,500 yards. This sonar has also been observed on a few small surface ships.

23. *Sonobuoys.* The Soviets have been producing passive sonobuoys since at least 1956. Improved electronics and acoustic system reliability, observed in recovered models, have not substantially increased sonobuoy detection capabilities. For example, there is no evidence of Soviet development of low frequency analyzing and recording sonobuoys, despite Soviet recovery of low frequency US sonobuoys and their understanding of low frequency acoustic propagation as evidenced by their publications. Soviet failure to exploit this technology may reflect shortcomings in signal processing, or a faulty assessment of US submarine quieting efforts. It is believed they have developed a new sonobuoy with a directional capability.

24. *Magnetic Anomaly Detection.* Soviet ASW aircraft, except possibly the Bear F, and some Hormones, use magnetic anomaly detection (MAD) equipment for target localization and for limited area search. Since introducing MAD equipment in about 1960, the Soviets have developed several systems. The

Il-38 May and at least some Be-12 Mail are probably equipped with a new MAD system. The May aircraft operate their MAD at higher altitudes than earlier patrol aircraft, and tenuous evidence from helicopter operations indicates that the new MAD system has a detection radius, a combined path through water and air, about twice that of the earlier systems. This improved radius is estimated to be between 1,500 and 2,000 feet—large enough to justify small area searches by MAD equipped aircraft. Higher operating altitudes and similar area searches have also been noted during recent Mail aircraft MAD operations, suggesting that some of these older aircraft may have been refitted with the new equipment.

25. *Infrared Wake Sensor.* There is some circumstantial evidence that a few Be-12s and some Il-38s as well as possibly the Bear F aircraft may be equipped with an experimental detection device, possibly an infrared wake sensor. These aircraft have conducted searches at altitudes beyond the ranges of the most recent MAD systems. At the present time, however, Soviet technology has probably not advanced sufficiently to support more than the development of a basic infrared localization device.

26. *Radar.* Soviet airborne surface search radars are capable of detecting surfaced submarines at ranges of up to about 100 nm and exposed masts and periscopes of submerged submarines up to about 15 nm. None of the Soviet radars is capable of reliably detecting wake effects from, or trailing wire antennas on, submerged submarines. Aircraft carrying the latest Soviet airborne radar, the Weteye, apparently make some limited area searches, and a new airborne I-band radar is undergoing flight testing in the Northern Fleet area.

IV. ANTISUBMARINE WARFARE OPERATIONS AND TRAINING

27. In terms of measurable operational and exercise activity, tactical ASW accounts for the bulk of all Soviet ASW activity.

28. *Coastal Operations.* Most Soviet naval exercises involve short-range forces and occur near fleet bases. Approximately 60 percent of the ASW exercises in the Northern and Pacific Fleet coastal waters include offshore defense forces and other short-range forces incapable of long-range deployment. These exercises usually involve coastal forces augmented by ASW aircraft, both helicopter and fixed wing, as well as major surface forces.

29. *Major Exercises.* Almost every year the Pacific and Northern Fleets each conduct a major exercise dubbed as a "Defense of the Homeland" exercise. The ASW aspect of these exercises has grown to include what probably are combined ASW barrier and search operations off north Norway.

30. Although the Soviets apparently devoted some exercise time in the 1970 exercise "Okean" to ASW defense in the ocean approaches to the USSR, over three-fourths of the defending forces were principally involved in anticarrier and antishipping operations.

31. In major Northern Fleet exercises for 1971, about half of the defending surface forces performed ASW activities in the area of their submarine barriers. Also, ASW patrol aircraft provided—for the first time in an exercise—24 hour on-the-scene coverage.

32. *At Sea Ship Defense.* The five fold increase in Soviet operations to distant areas such as the Mediterranean Sea and Indian Ocean since 1965 has increased naval requirements for fleet defense from submarine attack. Soviet ships operate most of the time

either in small groups of 2 to 5 ships or independently and must rely on their own defense capabilities. Combatants generally do not use ASW screens defensively (screen type formations are used to broaden the width of offensive ASW sweeps), although the Soviets do practice escorting of merchant and amphibious group convoys.

33. In the Mediterranean, for example, where there are normally about 15 to 20 surface combatants, the Soviets generally do not employ ASW screening forces even during exercises. They have, however, practiced forming surface ship and submarine barriers across the Sicilian Straits and to the south of Crete to seal off the central and eastern Mediterranean from submarine attack.

34. The four Soviet ASW aircraft previously stationed in Egypt had practiced fleet defensive roles against their own submarines both in airborne ASW barrier operations and in general reconnaissance missions. In addition, they participated in limited joint ASW operations with Soviet surface ships in the eastern Mediterranean.

35. *Command and Control Procedures.* [Soviet naval command and control is capable of providing the communications and command structure necessary to perform ASW tasks.]

36. []

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38. The tactical problems of on-scene control of distant ASW operations differ only in their complexity from coastal and sea approach ASW operations. In the Mediterranean command and control of these task groups is the responsibility of the commander of the Soviet Mediterranean Squadron, except when the commander of the Black Sea Fleet is present there. In either event the effective commander of the Mediterranean Squadron might also be involved in directing anticarrier or other naval operations.

V. TACTICAL ANTISUBMARINE WARFARE: CAPABILITIES AND OUTLOOK

39. Although tactical ASW is simpler in concept than strategic ASW, the Soviets still lack a generally effective defense for their ships against Western nuclear submarines. Modern submarine weapons have effective ranges well beyond the potential direct path ranges of almost all Soviet sonars (low frequency sonars being the exception). [

40. For the future, the Soviets have experimented and probably are continuing to experiment with low frequency sonars which will extend the possible detection range and accuracy of their systems. These new sonars may incorporate a bottom bounce and convergence zone capability. Variable depth sonars, to aid in detecting deep running sub-

marines, are believed to be under further development. The Soviets also continue to work on hydro-acoustic devices, and they may have introduced a new or modified sonobuoy into their inventory.

41. The Soviets are improving the capabilities of the shipborne KA-25/Hormone ASW helicopter. Anticipated continued effort on perfecting the autohover system of the Hormone would allow an all-weather and night airborne ASW capability which has not been noted up to now.

42. Although better detection capabilities continue to be a primary consideration of naval research and development, the Soviets also are aware of the high noise levels of their submarines, and they will attempt to improve on the engineering aspects of this problem. The Soviets are continuing to experiment with new weapon systems as well as expanding deployment of existing systems. The ASW weapon system associated with the Moskva-class helicopter cruiser [] may be deployed in the future on other combatants. The Soviets probably will continue to improve the performance of their ASW torpedoes as well.

43. Despite these continuing efforts to build ships which can defend themselves against submarines, state-of-the-art limitations remain, and the Soviets have little chance for developing an effective fleet defense over the next five years or so. At least during this period, improvements in submarine weapons and the development of even quieter Western submarines will probably continue the advantage of the submarine even in the face of expected improvements in Soviet ASW tactics, weapons, and acoustic sensors.

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